Remarks:

This amendment is submitted in an earnest effort to advance this case to issue without delay.

The specification has been amended to eliminate some minor obvious errors. No new matter whatsoever has been added.

The claims have been amended to place them in somewhat better US form and to define the invention with greater particularity over the art.

A new Abstract and Replacement drawings are submitted herewith.

US 6,666,047 of Shah describes a heated optical pumping cell 1 with a heated supply vessel 13. The inlet 13 is on the upper left and the outlet on the lower right. Avoiding contact with the wall is presumably effected by the use of high pressure (see column 6, lines 1 to 5). There is no nozzle on the inlet nor any free jet. A free jet according to the invention with contact only at the outlet is impossible in Shah since the mixture must travel across the cell from left to right. There is nothing in Shah to suggest formation of a free jet, while according to the

instant invention the mixture is injected under pressure as a jet through a nozzle as now claimed.

The same can be said for US 6,942,467 of Deninger where a completely different apparatus is shown, namely a system with at least one movable part. A compressor or valve helps to produce polarized gases in particular $^3$He. This reference has nothing to do with the jet polarizer of this invention.

In US 5,860,295 of Cates there is a test cell 4 of frustoconical shape as shown in FIGS. 1 and described in column 10, lines 14 to 16. This is not the cylindrical shape defined in claim 11, and much less with the relative orientations of inlet and outlet defined in new claim 21. In Cates a U-shaped tube opens into the accumulation reservoir. This reference thus deals with making it possible to convey the hyperpolarized gases. To this end the accumulator 17 has liquid nitrogen for freezing the gases and has detachment points 15 and 20 as defined in claim 4 and shown in FIG. 1. It is impossible to create anything resembling a free jet with the U-shaped tube, so that any inflow will make good contact with the inner wall at locations other than at the outlet 14.

US 2002/0107439 of Hersman has a tube 32 with an inlet 34 at the bottom and an outlet at the top. This system uses countercurrent flow, with the laser light opposite a portion of the gas flow (see 44). It is impossible to tell from the drawing or description here how flow takes place inside the tube 32.

WO 1999/008766 (whose US equivalent patent 6,318,092 is cited in the attached PTO-1449) relates to the polarization of noble gases with so-called auxiliary alkali metals. Thus two different alkali metals are used. This increases the efficiency of the polarization but has nothing to do with the instant invention. This reference is seriously far afield and has no relevance here.

In sum, Hersman is the best art, but this reference relates only to an apparatus for hyperpolarizing noble gases. The polarizing cell 30 seems to be longer than it is wide, but the resemblance to the instant invention stops there. Flow of the gas mixture is in a U-shaped path, going in the lower radial inlet and coming out the upper radial outlet, with laser light flowing axially along the cell 30. Thus the gas can be counted on to contact the inner walls of the cell both at the inlet and at the outlet, and also probably on the cell wall between the inlet and outlet opposite them.

There is nothing in Hersman to suggest the jet flow that avoids contact of the gas mixture except at the outlet, entering axially and leaving either radially (FIGS. 1 and 2) or axially (FIG. 4). The generic method concept of keeping the mixture out of concept with the inner walls except where it must contact them on leaving is not suggested. Nor is any jet flow suggested in Hersman. Furthermore in Hersman the flow is radial/axial/radial,

so that this reference does not really teach the laser directions defined in the claims.

In fact Hersman teaches away from the instant invention.

Shah and DE 199 37 566 teach increasing pressure. This produces an effect opposite that desired with the instant invention in that it inhibits any jet flow. Thus these references, coming from the same source as the instant invention, clearly show the state of the art on which this invention is an improvement.

Deninger has nothing to do with surface relaxation. What is shown at 10 does not relate to the claimed invention. The examiner is respectfully requested to elucidate this reference.

Cates has no surface relaxation also. There are no teachings here relative thereto and nothing to instruct the person skilled in the art so as to lead him or her to the instant invention. No free jet is suggested or shown. Contact with the inner walls is not an issue.

The examiner's attention is directed to http://www.answers.com/topic/jet-flow?cat=technology or http://de.wikipedia.org/wiki/Freistrahl that shows a diagram of a classic jet flow. With such a jet flow, the fluid exits the nozzle such that it is essentially out of contact with the wall through

which it is introduced into a chamber. As pressure is raised in the chamber, as taught by many of the references, such a jet flow becomes impossible.

For these reasons the claims are felt to be allowable over the cited art. Notice to that effect is earnestly solicited.

If only minor problems that could be corrected by means of a telephone conference stand in the way of allowance of this case, the examiner is invited to call the undersigned to make the necessary corrections.

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Enclosure: Extension (one month)
Marked Introductory part of Specification
Clean Introductory part of Specification
Substitute Abstract
Replacement drawing (4 sheets)
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